Descriptions of new species of West African grasshoppers with taxonomic notes on some species recently mentioned in the literature

(Orth. Acridoidea)

BY

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(Legon)

Eucoptacra spathulacauda sp. nov.

Male.—Fastigium verticis of usual *Eucoptacra* type (see Uvarov, 1953, p. 48), without continuous ridge behind innermost edges of compound eyes (fig. 1). Antennae short, not as long as head and pronotum as seen from above, with segments 6-16 alternately dark and light brown, segments distal to this being dark brown. Pronotum with low median carina cut by sulci 2-4 (fig. 2). Posterior margin of pronotum subrectangular. Pronotum light brown anterior to 4th. sulcus, pale yellowish olivaceous posterior to 1st. Tegmina with apices easily surpassing tips of folded posterior femora, membrane and veins in distal half dark brown, veins light brown in basal half.

Posterior femora and tibiae light brown with dark brown markings. Posterior tibiae with 9 outer and 11 inner black tipped spines; rather hirsute. Upper outer area of posterior femora with 3 diffuse brown markings anterior to narrowest part (fig. 3), most anterior one being very faint. Upper outer carina with 3 small black spots, lower outer carina with 6. Lower outer area punctate and blackish in outer half.

Cerci unique, deep basally with a long spatulate ventro-apical lobe (fig. 5). Sub-genital plate narrow and beak-like apically, ensheathing narrow upcurved penis valves (fig. 4). Supra-anal plate constricted apically giving a broad spatulate median apical lobe somewhat separated from rest of its plate (fig. 5).

Epiphallus as in fig. 9.

Female.—General characteristics as for male. Larger insect with median pronotal carina almost obsolete between sulci 3 and 4.

Differential diagnosis.

While the female is very similar to *Eucoptacra anguliflava* (Karsch) except in not having antennae which are longer than head and pronotum, the male bears the chief diagnostic characters in the form of the cerci. These show affinity with the cercus of *E. exigua* I. Bol. but are stouter basally, and with *E. basidens* Chapman which has a short robust lower apical cercus lobe (figs. 1 and 8).

Measurements	*Male*	*Female*
Head width	3.04	3.60
Posterior femur length	9.40	15.60
Tegminal length	14.80	18.20
Length frons to tegminal apices	19.00	22.90

Material.—Holotype ♂ Ghana, Volta reg., Amedzofe, 3.v.59, N. D. Jago, montane grassland arr. 2500 ft.

Paratype ♀ same data.

Discussion.—The species has a light olivaceous brown appearance in life but fades to light brown after drying. It seems to be an inhabitant of the upper montane grassland, and although only known from Amedzofe, may also occur on other hill tops in the area. It is possible that the '*Coptacra succinea*' described by Karsch (1893) was actually a female of this species, although since *E. anguliflava* also lives in the same localities this cannot be proven.

Pseudophialosphera sylvatica (Chapman, 1961) comb. nov.

Following on recent synonymy by Kevan (1955) and work by Dirsh (1952) it is clear that *Apoboleus sylvaticus* Chapman, 1961 should be placed in the genus *Pseudophialosphera* Dirsh, 1952. Thus Chapman states in his species description that the insect lacks the densely packed oblique veinlets between costa and subcosta of the tegmina, so characteristic of the genus *Apoboleus*. This has been confirmed by examination of material now in the Legon collections. Furthermore, like *Ps.*

severini (Ramme) and *Ps. tectifera* (Ramme), the pronotum is hardly rugose, slightly inflated and rounded above, the posterior margin of the pronotum is simple angular and not apically incised, while the posterior tibiae are wholly red. This new combination is of interest since we now have two West African representatives of a genus only formerly recorded from East Africa. (A new West African species of the genus is currently being described by D. Hollis at the British Museum.)

Material.—Besides material from the type locality at the Esuboni Forest Reserve, Eastern region, the species is now known from two further localities in Ghana:

(i) Ashanti reg., N. W. of Nyinahin, Aya hill and forest reserve.

(ii) Ashanti reg., N. of Kumasi, 5 miles N. of Abofour.

Acorypha dipelecia sp. nov.

Male.—Penis valves forming two short lobate structures, appressed medianly and with an elongate concavity at their inner margins. Cingular valve very deeply pigmented, rather shorter than penis valves and triangular in cross section; visible between apex of penis valves when viewed from posterior aspect (fig. 14).

Cercus (fig. 16) with a single dark tooth bearing lobe apically and a moderately broad flat upper apical lobe which is rather more than twice length of tooth bearing lobe. Length of cercus to maximum depth at apex 3.2-4.5. Upper apical lobe not as broad as that in *Caloptenopsis unicarinata* (Krauss). No trace of third lobe below tooth bearing lobe.

Tegmina when folded surpassing knees of folded posterior femora. Hyaline apically. In basal 2/3 with series of 4 to 6 darker spots in area anterior to Cu2. Light line along line of Cu2 often pronounced enough to produce a 'marginellus' variety equivalent to that in *Calliptamus* spp.

Wings colourless, faintly infumate brownish apically.

Vertex of head rounded above, its uppermost point well above level of median pronotal carina (fig. 11). Fastigium verticis starting between compound eyes (fig. 10) and finishing on antero-dorsal surface of head on a level with each lateral ocellus. Head light brown with darker brown or blackish markings except on gena, frons down to fronto-clypeal suture and mandible, where light blue grey pigment ornaments a shiny cuticle. Sub-gena buff. Labrum broadly expanded apically and

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predominantly light ochraceous brown. Compound eyes in life with 6 clear black eye stripes on a grey background which shades into ginger brown dorsally. Posterior 1/3 of eye black. Surface flecked with large irridescent creamy spots. Antennae 1 1/2 times length of head and pronotum when seen from above.

Pronotum with slightly concave median dorsal profile. Three transverse sulci crossing disc in front of its middle. Metazone covered in small pits. Side of pronotum with raised rugosity in its upper anterior quarter, lower edge of which is black and shiny. Area behind third sulcus pitted and black in colour. Lower half of pronotal sides buff or pale ochrous brown with darker markings, area between first and second sulcus being blue grey. Posterior edge of pronotum rectangular. Lateral carinae converging sharply in front of 4th. sulcus (fig. 12).

Abdomen pale orange yellow. Sub-genital plate and cerci pale yellow.

Inner area of posterior femur, and lower inner area, pale orange yellow. No black spots extend onto inner area of posterior femur, three dark spots occurring on dorsal surface of femur only (fig. 17). Inner side of knee pale orange yellow, outer side with orange yellow lunule lined posteriorly with black. Upper outer area cream to brownish cream with blue-black darker markings which become black as they cross upper outer carina. Outer area and lower outer area pale cream. Outer area also with blue-grey areas and darker black spots.

Posterior tibiae pale orange-yellow. Tips of spines and spurs, and proximal constriction near joint with posterior femur, black. Slightly hirsute between spines and on ventral surface. Usually 8 internal spines (sometimes however 7 or 9) and 7 external spines (sometimes 6). Tibial spines showing modification with innermost spur unmodified, outermost of inner pair of spurs twice length of innermost of outer pair

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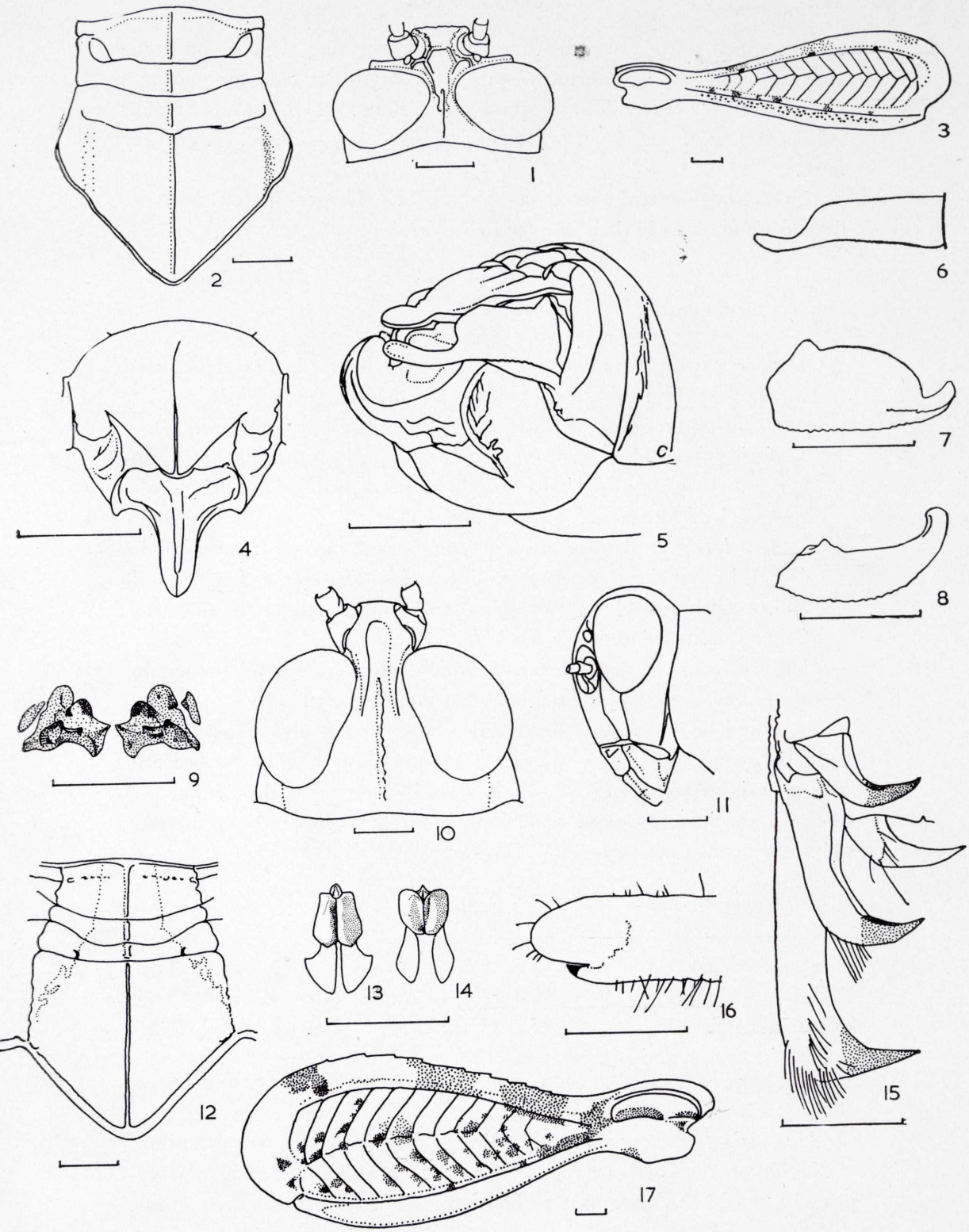
Figs. 1-5.—Male of *Eucoptacra spathulacauda* sp. nov.: 1) dorsal view of head: 2) dorsal view of pronotum; 3) outer side of right posterior femur; 4) ventral side of sub-genital plate; 5) right lateral oblique view of abdominal apex including cercus. Fig. 6.—Cercus of *Eucoptacra exigua* I. Bol. Figs. 7 and 8.—Outer and dorsal aspects of left male cercus of *Eucoptacra basidens* Chapman Fig. 9.—Epiphallus of *Eu. spathulacauda*. Figs. 10-12 and 14-17: Male anatomical features of *Acorypha dipelecia* sp. nov. Fig. 13.—Being penis apex of *A. modesta* Uv.: 10) dorsal aspect of head; 11) lateral aspect of head; 12) dorsal aspect of pronotum: 14) posterior aspect of penis valves; 15) outer aspect of tibial spurs of left posterior tibia; 16) outer aspect of right cercus apex; 17) outer aspect of left posterior femur. All scale lines represent 1 mm.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and modified with a ventral hirsute lobe projecting well beyond true spur tip (fig. 15). Outermost spur half length of its neighbour and unmodified. Tarsi and tibial spurs pale yellow. Two pairs of blackish spots 1/3 of way from proximal end of posterior tibiae. Often very faint.

Females.—General colour as for males. Larger insects with no diagnostic features in their ovipositor valves.

Differentil diagnosis:

1. Differing from *A. modesta* Uvarov, with which it has been confused in the past, by having penis valves which diverge upwards. In *A. modesta* outer edges of penis valves converge upwards (fig. 13).
2. Differing from *A. brazzavillei* (Sjostedt, 1931) in having much longer antennae, ie. 1.4 times length of head and pronotum in new species, 1.25 times in *A. brazzavillei.*
3. Differs from *A. picta* Krauss, *A. ornatipes* Uvarov, *A. pallidicornis* (Stål), in that these species have inner side of posterior femora pink and or with a black spot or spots. The inner side of the posterior femur is immaculate in *A. dipelecia.*
4. Differs from *A. recta* Uvarov, which has top of head projecting above line of median carina by only a small margin.

It should be noted that the genera *Caloptenopsis* and *Acorypha* are artificial groupings as they stand. They are shortly to be revised and new generic groupings given. It is clear however that the genitalia of this new species are unique and differ from all species hitherto attributed to the genus *Caloptenopsis* I. Bolivar.

Measurements	*Female*	*Female*
Head width (26)	3.7- 5.0, 4.09:	(19) 4.3- 4.8, 4.52
Posterior femur length (26)	12.4-17.4, 13.26:	(19) 14.3-18.0, 15.85
Tegminal length (26)	17.7-25.4, 19.85:	(19) 20.1-24.9, 22.51
Length frons to tegminal apices (26)	24.3-33.2, 26.63:	(19) 25.9-32.8, 29.45

Material.—All material from Ghana, and collected by the author.

Holotype ♂ Northern reg., 2 mls. S. of Masaka, 30.xii.59. Paratypes: 3 ♂ ♂, 2 ♀ ♀, same data as holotype; 3 ♂ ♂, Northern reg., 2 mls.

N. of Yendi, 18.iv.62; 1 ♂, Northern reg., 21 mls. W. of Busana, Sawla-Tamale rd., 20.iv.62; 4 ♂ ♂, 9 ♀ ♀, Northern reg., 4 mls. N. of Mole R., Busunu-Doboye rd. (26-29). xii.63; 1 ♀, Upper reg., 10 mls. E. of Tumu, 19.iv.62; 3 ♂ ♂, 1 ♀, Upper reg., 10 mls. E. of Han, 19.iv.62; 2 ♂ ♂, 3 ♀ ♀, Upper reg., 5 mls. E. of Han, 7.iv.62; 1 ♂, Upper reg., 20 mls. W. of Bawku, hills E. of Gogo rd., 19.iv.62; 2 ♂ ♂, 2 ♀ ♀, Volta reg., Keti Krachi R. Ho., 28.xii.62; 1 ♂, Volta reg., 35 mls. S. of Keti Krachi, 17.iv.62; 1 ♂, 1 ♀, Eastern reg., 5 mls. S. of Oyibi, Tema-Adome rd., 17.iv.62.

Discusion.—This is the most widespread of Ghana's representatives in the sub-family Calliptaminae, and unlike other members enters the eastern end of the Accra plains. Habitats are characterised by sparse vegetational cover and bare soil or gravels. The species seems unable to survive the rigours of the montane grassland or of the extremely arid Sudan savannah belt north of Ghana. It seems to be more or less confined within the Guinea savannah belt.

In Dr. R. F. Chapman's recent paper on the grasshopper fauna of Ghana the species was misidentified as *Acorypha modesta* Uvarov. From the data available it would appear that these two very similar species do in fact meet and slightly interdigitate without breeding in northern Nigeria. *Acorypha modesta* does not seem to occur west of Nigeria.

Gymnobothrus ephippinotus sp. nov.

Male.—Vertex with deep groove-like fastigium verticis, traversed at anterior level of compound eyes by an arcuate groove (fig. 19). Head in profile rounded above, eyes level with top of vertex. Antennae just over 1 1/3 to 1 1/2 times length of head and pronotum, with basal segments flattened (fig. 25).

Pronotum saddle-shaped, rugose, with indistinct dorso-lateral carinae cut by sulci 2-4, obliterated between sulci 2 and 3, and markedly incurved. Median carina entire except at 4th. sulcus. Posterior dorsal margin of pronotum rounded acutangulate (figs. 20, 21).

Tegmina and wings well developed. Tegmina distinctly broadened apically (fig. 22). Hind wings colourless. Cerci simple conical. Epiphallus as in fig. 24.

General colouration brown with dark brown or blackish markings. Often with median dorsal cream stripe running along vertex and pro-

notum to anal area of tegmina. Lateral lobes of pronotum lighter ventrally. Antennae with light and dark segments giving an annulate appearance. Tegmina with a series of 5 dark spots arranged linearly in basal 2/3, area between C and R_1 often with light line of cream pigment near base of tegmen. Male abdomen red at maturity, at least ventrally. Posterior femora with 3 dark blackish spots above extending as paler broad diffuse markings onto outer area. Lower outer carina bearing 4 or 5 blackish spots (posterior pair often fused), spaces between spots yellowish. Lower outer area with dark brown or blackish stripe ventrally, spots and yellow colour of lower outer carina extending onto it along its outer edge. Lower inner area yellowish to blackish. Inner area dull cream with 2 diffuse spots. Kness black (fig. 23). Posterior tibiae pale grey or bluish grey in apical half with blackish pigment at distal and proximal end, and in an annulus about 2/5 of way along tibia from base. Blackish pigment also extending along ventral side of each posterior tibia. Tibial spines and spurs cream with black tips. Outer row of tibial spines very black on outer side.

General appearance giving an impression of more or less distinct dark blackish or brown markings on a lighter background.

Females.—Similar colouration to that of male, though less contrastily pigmented. Antennae about 1 1/2 times length of head pronotum.

Differential diagnosis:

Like *Gymnobothrus emini* (Rehn), *G. temporalis* (Stål), and *G. longicornis* (Ramme) in having antennae longer than head pronotum, but not possessing red lower outer area of posterior femora. Pronotal morphology similar to that of *G. flaviventris* Uv. 1953, and *G. sellatus* U. 1953. Unlike *flaviventris* Uv. however, pronotal carinae markedly divergent anteriorly and differing from *sellatus* Uv. in having shorter antennae and a much longer pronotum in proportion to its width.

Clearly closely related to *G. sellatus* Uv., in some respects e. g. nature of fastigium verticis, antennae and frontal ridge, this species shows affinity with *Oxybothrus* Uv.

Measurements	*Male*	*Female*
Head width (9)	2.7- 3.4, 2.90:	(5) 3.1- 3.5, 3.25
Posterior femur length (9)	10.0-12.2, 11.10:	(5) 11.9-14.2, 12.69
Tegminal length (9)	16.4-18.7, 17.28:	(5) 17.7-21.6, 19.51
Length frons to tegminal apices (9)	20.3-29.1, 23.04:	(5) 23.2-28.2, 25.54

Material.—Holotype ♂ Ghana, Northern reg., 2 mls. S. of Masaka, Tamale rd., 30.xii.59, N. D. Jago. Paratypes: 2 ♂ ♂, 1 ♀, same data as holotype; 1 ♂, Ghana, Upper reg., 5 mls. E. of Han, W. of Tumu, 7.iv. 62, N. D. Jago; 1 ♀, Ghana, Upper reg., N. of Nakpanduri, Gambaga scarp, 18.iv.62, N. D. Jago; 1 ♂, Ghana, Volta reg., 2 mls. W. of Kpandu, 27.xii.59, N. D. Jago; 1 ♀, Ghana, Ashanti reg., W. bank of R. Volta, Keti Krachi ferry, 29.xii.59, N. D. Jago; 1 ♂, Upper Volta, 2 mls., N.E. of Kantchari, 28.iii.62, N. D. Jago; 2 ♂ ♂, 1 ♀, Nigeria, Bida, 20.v.63, H. Roberts; 1 ♂, Nigeria, Oyo, 20.vii.62, H. Roberts.

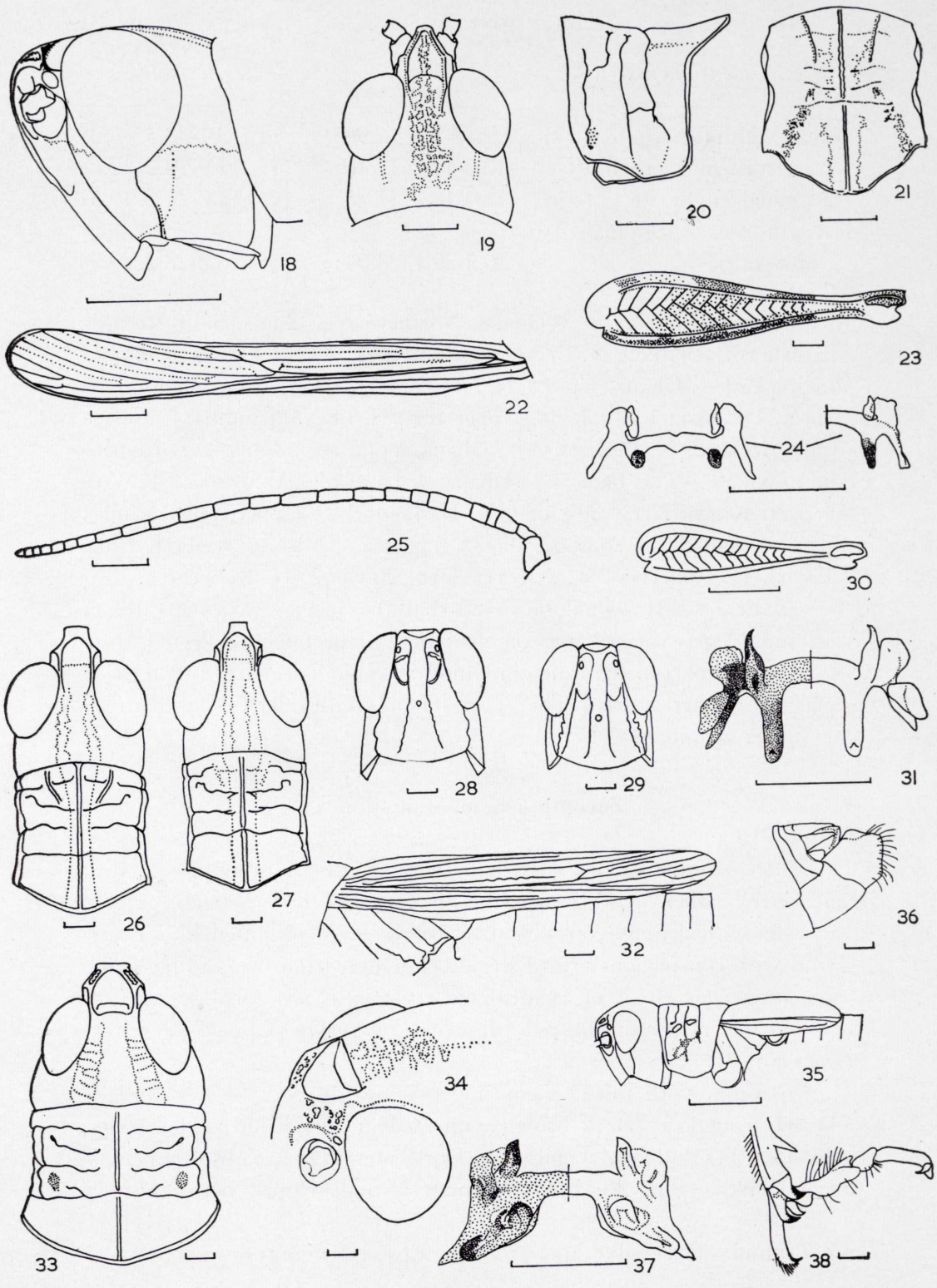
Discussion.—It should be noted that the species varies greatly in size and degree of melanic pigmentation. Specimens collected from the southern part of the range in Guinea savannah are larger than those collected further north. The species inhabits dry well drained areas in Guinea savannah.

Zacompsa helonoma sp. nov.

Male.—Antennae just less than twice length of pronotum. Head and vertex rather broad compared with *Zacompsa festa* Karsch. Frontal ridge broadening conspicuously below level of antennal sockets. Head with conspicuous cream stripe below eye, from frons to posterior edge of genae. Rest of head above eyestripes dark brown, with or without two rather diffuse reddish stripes on vertex (figs. 26-29) which bears a median cream stripe.

Pronotum with third sulcus indistinct on disc. Posterior margin obtusely rounded. Dark brown with median dorsal dull yellow stripe and side lobes dull yellow apically. Dorsolateral carinae obsolete behind second sulcus (fig. 26) but sometimes also developed between sulci 3 and 4.

Tegmina markedly tapered, their tips extending to just beyond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half way along folded posterior femora. Tegmina dark brown, yellowish posterior to vein 1A, and lightish band along distal half of front margin (fig. 32).

Body yellow below. Abdomen orange-brown above. Cerci and supra-anal plate darker brown.

Posterior femora orange red below, and on both inner and outer area. Upper outer area brownish with single cream spot about 1/4 of way fron base of femur (occasionally with a second smaller one distally). Yellow annulus in front of knee; knee black. Posterior tibiae sooty blue-grey in apical half. Black below and with two black annuli, one at proximal end near base of knee of femur, and another just beyond a pale yellowish annulus about 1/3 of way down tibia. Fore and mid legs with their femora brownish, tibiae and tarsi olivaceous (fig. 30).

Epiphallus as in fig. 31.

Female.—As for male but a larger insect. Also brachypterous. Wings often so short that they scarcely reach half way along folded posterior femora.

Differential diagnosis:

1. Differs from *Z. bivittata* Uv. in that both sexes are brachypterous. Also in *Z. bivittata* Uv., anterior light tegminal stripe extends bodly from tip of tegmen to base of inter C and R_1 area.

2. Differs from *Z. pedestris* Uv. in not having fore wings reduced to tiny scales. General facies midway between those of *Z. bivittata* Uv. and *pedestris* Uv. in this respect.

3. Differs from *Z. festa* Karsch, with which it is most closely asso-

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Figs. 18-25.—Anatomical features in males of *Gymnobothrus ephippinotus* sp. nov.: 18) lateral aspect head; 19) dorsal aspect of head; 20 and 21) dorsal and lateral aspects of pronotum respectively; 22) right tegmen showing venation; 23) outer side of left posterior femur; 24) epiphallus; 25) left antenna viewed from above. Figs. 26-32.—*Zacompsa* sp.: 26) *Z. helonoma* sp. nov. dorsal aspect head and pronotum; 27) *Z. festa* Karsch of same region; 28) anterior of head *Z. helonoma;* 29) same in *Z. festa.* Figs. 30-32.—All *Z. helonoma* male: 30) left posterior femur from outer side; 31) epiphallus; 32) tegmen of left side. Figs. 33-38.—*Pseudogmothela cheradophila* sp. nov.: 33) dorsal view head and pronotum of male; 34) oblique view vertex of female; 35) lateral aspect head, pronotum and tegmina of male; 36) tip of male abdomen; 37) male epiphallus; 38) tip of left posterior tibia of male, viewed from lateral aspect. All scale lines represent 1 mm., except figs. 30 and 35 where scale represents 5 mm.

ciated geographically, in being a slightly broader insect with slightly stouter posterior femora. In *Z. festa* Karsch ridge decidedly narrow (fig. 29), not markedly expanded below level of antennal sockets. Moreover in *Z. festa* Karsch whole insect is more contrastingly coloured, head, pronotum, and tegmina being black and yellow. In *Z. helonoma* black is replaced by dark brown, and yellow on the vertex replaced by light reddish brown.

4. Differs from *Z. karschi* Ramme which is macropterous in both sexes.

Measurements	*Male*	*Female*
Head width (12)	3.7- 4.2, 3.78:	(2) 4.5- 4.7, 4.59
Tegminal length (12)	10.3-14.8, 13.58:	(2) 16.6-17.4, 16.99
Posterior femur length (12)	9.7-12.2, 10.99:	(2) 12.6-13.4, 12.96
Length frons to tegminal apices (12)	16.1-18.4, 17.26:	(2) 20.8-21.7, 21.25

Material.—Holotype ♂ Ghana, Northern reg., 6 mls. N. of Mole R., Busunu-Doboye rd., 26.xii.63, N. D. Jago. Paratypes: 9 ♂ ♂, 2 ♀ ♀, same data; 2 ♂ ♂, Ghana, Northern reg., 2 mls. W. of Doboye, 24.xii. 63, N. D. Jago.

Discussion.—While *Z. festa* Karsch predominates in moister places in the grassy glades of riverine forests and montane forests in Volta region of Ghana, this new bracypterous species is found in open marshy savannah or marshy savannah thickets in areas remote from the hills of Togoland. The specialised habitat among lush marsh grasses, seems to have encouranged brachypterous facies. It is of interest that *Z. festa,* which lives in relatively dry places, has retained fully alate adults, *Z. bivittata* having become brachypterous only in the female. In *Z. pedestris* Uv. an extreme condition is displayed in which the attenuate apices of the tegmina reach little beyond the base of the folded posterior femora.

Four species were previosly known in this genus:

Z. festa Karsch, Togoland, Sierra Leone, Nigeria, Mauretania, Cameroons, Niger, Ghana.

Z. bivittata Uv., Nigeria, Senegal, Sudan, Cameroons.

Z. karschi Ramme, Nigeria, Niger, Cameroons.

Z. pedestris Uv., Tanzania (Nyika plateua).

The distribution of the above species is interesting in indicating continuity of marsh and moist forest grass faunas in a wide area of East and West Africa. There are probably other species in this genus awaiting discovery, especially in East Africa.

Pseudogmothela cheradophila sp. nov.

Males.—Head rather inflated, rounded above with a well marked fastigium verticis, and clearly demarcated temporal foveolae (figs. 33, 35). Antennae quite short, being only just a little longer than length of head and pronotum.

Pronotum with well marked median carina broken only by 4th. transverse sulcus. Hind margin of pronotum very obtuse angulate (fig. 33). Well marked black stigma on upper edge of sulculi linking 1st. and 3rd., and 3rd. and 4th. sulci on side of pronotum.

Tegmina reduced to very small scales whose apices reach only 1/3 of way along folded posterior femora, and whose anal areas just overlap above thorax.

Abdomen unicolourous brown to slightly olivaceous in region of sub-genital plate (fig. 36). Epiphallus as in fig. 37.

Posterior femora light brown with bluish flush across middle of outer area. Lunules of knees lined below in black. Posterior tibiae hirsute, with distinct pink tinge and with inner apical spur of outer pair of apical spurs, highly modified and elongate, as in the genus *Calopteno*psis (fig. 38).

General colour light grey brown or brown in life, with grey flush on tegmina.

Females.—As for males except in sexual characters, but with fastigium verticis less deeply impressed and temporal foveolae reduced to a group of pits on either side of vertex (fig. 34). Dorso-lateral pronotal carinae obsolete except anterior to sulcus 2.

Differential diagnosis:

1. Very brachypterous, in this respect resembling *Pseudogmothela pedestris* Uv. Tegminal veins simple, tending to be unbranched (more in ♀), intercalary veins absent, except between base of R_1 and Cu_1.

Tips of tegmina in fact fall just short of edge of 4th. abdominal tergite or just surpass it.

2. Unlike *Ps. pedestris* Uv., antennae do not extend beyond middle of abdomen. This new insect is also a larger species (see measurements).

3. Unlike *Ps. megalocephala* Kevan and *Ps. pedestris* Uv. the males do not have brightly coloured red or pink abdomens. Moreover unlike *Ps. pedestris* the lower inner side of the posterior femora is dull yellowish, not pink.

4. Unlike *Ps. megalocephata* tegmina possess no stripe of paler colour.

5. Posterior tibiae not yellow as in *Ps. megalocephala* in all material, but including specimens with dull orange or pale pink tibiae.

Measurements	*Males*	*Females* (Senegal)
Head width (4)	3.9- 4.2, 4.05:	(2) 5.0- 5.1, 5.05
Length posterior femora (4)	13.5-14.7, 14.10:	(2) both 17.9
Tegminal length (4)	7.2- 8.6, 7.75:	(2) 5.4- 8.7, 8.55
Length frons to tegminal apices (4)	14.3-14.7, 14.50:	(2) 17.2-17.8, 17.50

	Females (Ghana)
Head width (3)	5.7- 6.0, 5.87
Length posterior femora (3)	20.9-21.8, 21.23
Tegminal length (3)	10.9-12.4, 11.70
Length frons to tegminal apices (3)	21.9-23.6, 23.03

Material.—Holotype ♂ Mali, S. of Mopti, Togo-Safara rd., 21.viii. 62, N. D. Jago. Paratypes: 2 ♂ ♂ same data as holotype; 1 ♂, 4 ♀ ♀ (2 of them nymphs), Senegal, Tabacounda (10-18).ix.1962, R. A. Farrow (bush, bare patches); 1 ♀, Ghana, Northern reg., 2 mls. S. of Masaka, Tamale rd., 30.xii.59, N. D. Jago; 2 ♀ ♀, Ghana, Northern reg., 4 mls. N. of Mole R., Busunu-Doboye rd., 27.xii.63, N. D. Jago.

Discussion The female figure is that of Ghanaian material which is much larger than the other females, has a smoother vertex, and proportionately longer tegmina. Unfortunately no Ghanaian males are

known. Hence it seems more satisfactory to group them as paratypes with the rest of the material. The Senegal male is longer winged than those from Mali, and has yellow posterior tibiae while the Mali material has the tibiae pinkish or yellow. Ghanaian females have posterior tibiae decidedly pink, so that this may be a clinal character related to rainfall, larger forms occurring in the south of the range.

The genus has been previously recorded from southern, southwest, central and east Africa.

The species frequents gravelly areas in dry Guinea and Sudan savannah. The posterior tibial spur seems to be elongate as an adaptation to obtaining a purchase on loose surfaces. Similar spur modifications occur in the Calliptaminae.

Dnopherula leionota sp. nov.

Males.—Antennae short, rather broad, and not as long as length of head and pronotum. Temporal foveolae with indistinct borders (fig. 39); broad fastigium verticis which is rounded acutangular in front. Vertex weakly irregularly tricarinate above. Frontal ridge subparallel sided below antennal sockets.

Pronotum rather smooth on disc, punctured in posterior metazone. Dorso-lateral carinae weak but almost entire, except in posterior part of metazone; carinae diverging anterior to second sulcus. Lateral carinae cut by 2nd. and 3rd. sulci. Dorso-lateral carinae diverging behind 2nd. sulcus (fig. 39) but not crossed by 3rd. sulcus. Median carina entire, except where cut by 4th. sulcus. Dorso-posterior margin of pronotum obtusangulate. Dorso-lateral part of pronotum more or less smoothly rounded into lateral and leaving depressions in spaces between sulci 1 and 3, and between sulci 3 and 4 (fig. 39).

Tegminal apices extending beyond knees of folded posterior femora. Venation simple, except for a curious alignment of cross veins between branches of R, M, and Cu (fig. 41). Scapular field distinctly expanded and opaque.

Cerci simple, conical. Abdomen and cerci straw yellow in colour.

Posterior femora dull orange brown externally, yellowish immaculate internally, except upper inner area which bears 2 faint brown spots in its anterior half. Knee lunules blackish. Posterior tibiae orange with 11 inner and 10 or 11 outer black spines.

General colouring dark brown laterally, yellowish below, with head and pronotum dark brown above shading to light creamy brown ventrally. This basic colour regime may be rather uniform or overlaid with darker brown speckling. If of latter type, then median dorsal straw coloured stripe is never developed, and dark spots on inner upper area of posterior femora extend onto upper outer area as vell.

Epiphallus as in fig. 42.

Females.—Like males in general colouring. Vertex with less pronounced fastigium and carinae (fig. 40), and with temporal foveolae almost obliterate. Larger than males. Often with 12 outer and 11 inner posterior tibial spines.

Differential diagnosis:

1. Posterior femora much deeper and more robust than in *D. crucigera* Uv. Posterior tibiae not grey as in *D. crucigera.*
2. Lower outer sulcus of posterior femora not black as in *D. callosa* Karsch.
3. Unlike *D. marshalli* Miller in not having metazone scarcely broader than long, and in not having dirty reddish posterior tibiae in ♂.
4. Lacking tegminal venation of *D. citrina* (Miller), and *D. rotundifrons* (I. Bol.). Also does not lack lateral pronotal carinae.

Measurements	*Male*	*Female*
Head width (3)	3.1- 3.4, 3.13:	(7) 3.9- 4.3, 4.02
Posterior femur length (3)	11.3-12.4, 11.69:	(7) 12.1-15.9, 14.28
Tegminal length (3)	16.3-18.8, 17.93:	(7) 16.3-19.8, 18.36
Length frons to tegminal apices (3)	20.8-23.8, 21.99:	(7) 25.1-27.5, 26.26

Material.—Holotype ♂ Ghana, Northern reg., 6 mls. N. of Pongeri, Sawla-Wa rd., 20.iv.62, N. D. Jago. Paratypes collected by author in Ghana: 1 ♀, Upper reg., 20 mls. W. of Bawku, hills E. of Gogo rd., 19.iv.62; 2 ♂ ♂, 3 ♀ ♀, Northern reg., Chana-Chuchilaga rd., 19.iv.62; 1 ♀, Northern reg., 13 mls. N. of Sawla, 20.iv.62; 1 ♀, Upper reg., 10 mls. E. of Tumu, 19.iv.62; 1 ♂, Northern reg., 29 mls. N. of Tamale, Gushie, 31.xii.59; 1 ♀, Dahomey, 2 km. N. of Natitingou, 27.iii.62, N. D. Jago;

1 ♀, Togoland, nr. Lama Kara, 10 km. N. of Tchitchao, 26.iii.62, N. D. Jago.

Discussion.—This species has been designated to this genus following Dirsh's redefinition (see Dirsh, 1958).

This new species is of particular interest as being the first record of this genus from West Africa. Other members of the genus have been recorded from Nyasaland, Rhodesia (Northern and Southern), and Angola. It inhabits dry Guinea savannah and Sudan savannah type derived savannah.

Phorenula I. Bolivar 1909.

The following descriptions and discussions are based on *Phorenula* material collected in Ghana by Dr. R. F. Chapman and myself. Dr. Chapman recently (1962) mentioned 2 of these species in a paper on Ghanaian grasshoppers under the names *Phorenula* A, and *Phorenula* B. He has very kindly allowed me to examine his material and include it with my own. His '*Phorenula* C' in the same paper seems to be similar to the recently described *Phorenula phippsi* Llorente.

Phorenula acerosa sp. nov.

Males.—Antennae about 1 1/2 times length of head and pronotum, slightly flattened in middle section. Eyes prominent. Head in profile with vertex markedly convex. Fastigium verticis deep, with three faint irregular carinae extending from its open posterior side and disappearing after a short distance. Temporal foveolae deep and well marked. Frontal ridge diverging downwards between antennal sockets and slightly constricted in region of median ocellus (fig. 43).

Pronotum sub-parallel at sides. Dorso-lateral pronotal carinae weak diverging in front of second sulcus and behind third sulcus, but obliterated between these sulci and at a short distance to either side. Median carina bold and entire except where cut by 4th. tranverse sulcus. Second and third sulci deeply etched and finishing well short of median carina (fig. 44); posterior dorsal edge of pronotum obtusangular.

Tegmina abbreviated, area behind Cu_2 densely reticulate and expanded. Rest of tegmen fragile and membranous with greatly expanded scapular area. Discoidal and interulnar fields subequal, former

being without an intercalary false vein. Tegminal apices more or less pointed depending on degree of tegminal development (fig. 46). Tegminal apices usually level with or falling short of tip of abdomen and certainly never reaching tips of folded posterior femora.

Cerci simple, conical, slightly flattened from side to side.

Posterior femora light orange-yellow with knees blackish or brownish. Lunules always black. Outer and upper sides of posterior femora immaculate, but sometimes with upper outer area and upper inner area traversed by a small anterior spot (faint), a median spot (at 2/5 from base of femur) and a broad posterior spot occupying 1/5 of upper surface of femur. Last two spots often extend into outer area as more or less indistinct arcuate markings. In dark specimens, upper inner and lower inner carinae also marked with dark pigment. Nine outer and eleven inner posterior tibial spines tipped with black. Tibiae black adjacent to femur, then whitish, but quickly shading into pink which deepens in intensity distally.

General colour light brown or grey brown, with darker brown markings. A form with a median dorsal light brown stripe on vertex and median carina of pronotum is quite common, as is a form in which dorso-lateral pronotal carinae are conspicuous in being light in colour. Tegmina often with dark brown markings in discoidal field.

Epiphallus as in fig. 45.

Females.—As for males but usually more darkly pigmented, and often more brachypterous, with apices of tegmina extending only about 3/5 of way along folded posterior femora. Fastigium verticis and temporal foveolae shallower. Bluish grey area at base of posterior tibiae more extensive than in males, often occupying proximal 1/3 of tibia. Tegmina simpler than in male, without expanded scapular field, and with discoidal field containing 2 rows of indistinct cells. Tegminal margins more or less smoothly tapered to an acutely rounded tip. Antennae shorter, about same length as head and pronotum.

Differential diagnosis:

Differ from *Phorenula phippsi* which is superficially very similar, in having a narrower but more deeply incised fastigium verticis, posterior edge of pronotum obtusangulate not rounded obtuse, and in having rather longer antennae. Above all they differ in the abbreviated male

tegmina, the discoidal field in *P. phippsi* bearing two rows of cells in its basal 1/2 to 2/3.

Measurements	*Males*	*Females*
Head width (25)	2.1- 2.5, 2.34:	(12) 2.7- 3.1, 2.87
Posterior femur length (25)	6.8- 8.5, 7.53:	(12) 8.8- 9.9, 9.28
Tegminal length (25)	5.9- 9.0, 7.22:	(12) 5.5-11.1, 7.45
Length frons to tegminal apices (25)	9.5-13.2, 11.16:	(12) 10.1-15.3, 12.21

Material.—All material from Ghana, except 1 ♂, Nigeria, Bida, 19. viii.62, H. Roberts.

Holotype ♂ Northern reg., Morno, 2.v.58, R. F. Chapman. Paratypes: Eastern reg.; 3 ♂ ♂, 1 ♀, Ofankor, 13.v.54; 2 ♂ ♂, Tema, 23. iv.58; 1 ♂, 1 ♀, Nyigbenya, 19.ii.58; 1 ♂, nr. Tema, 3.viii.58; 2 ♂ ♂, Kpong, 3.viii.59; 1 ♂, Dahwenya, 9.viii.58; 1 ♂, Akuse, 17.xii.58; 1 ♂, Shai hills, 30.x.58; 1 ♂, Ofankor, 9.viii.58; 1 ♂, Ofankor, 11.ii.58: Northern reg.; 1 ♀, Damongo, 15.iv.59; 1 ♂, Kalbruipe, 17.iv.59; 1 ♂, Morno, 2.v.58; 1 ♂, Tuna, 15.iv.59, all collected by R. F. Chapman.

Also 6 ♂ ♂, 2 ♀ ♀, Volta reg., Keti Krachi R. H., 18.iv. and 27.xii. 62; 1 ♂, 1 ♀, Eastern reg., 1/4 ml. E. of Shai hills, 19.xi.61; 1 ♂, 1 ♀, Eastern reg., Shai hills, 14.vi.59; collected by N. D. Jago.

Discussion.—This new brachypterous and flightless species frequents dry areas with short sparse vegetational cover, this being the terrain often seen in areas of rocky outcrops in Guinea savannah and on alluvial gravels at the base of hills. The insects are very small and inconspicuous, looking very much like pieces of chaff broken from the surrounding grasses.

Phorenula B.

This species, confined to the southern grasslands of Ghana, seemed at first examination to consist of two series material:

(i) A number of specimens, rather larger than the rest of the series, and more darkly pigmented with well marked posterior femoral markings.

(ii) A number of specimens, actually the bulk of the material, consisting of smaller more uniformly coloured material, which displayed

*

a tendency for the suppression of discrete blackish markings on the upper and outer sides of the posterior femora.

I had tentatively placed the first group under *Ph. dorsata* Miller in the Legon collections, for this darker form had a strong resemblance to the female paratype of that species in the British Museum. The second type, on the basis of colour pattern and general morphology, fits well into the species *Ph. obliquifrons,* although it is slightly narrower across the pronotal disc than material of that species in the British Museum. On carefully examining all our Ghanaian material however I am now inclined to believe that the colouration, form of the fastigium verticis, and dorso-lateral carinae, as well as gross size differences, are insufficient grounds for separation of these groups into the two species units described above. Slight individual variation accounts for the differences observed between Chapman's *Phorenula* B in both its forms, and what we both agree to call *Ph. obliquifrons.* For the same reason, the insects first thought to be *Ph. dorsata* must also be combined with the other material under *obliquifrons.* It is clear however, that the Accra plains populations have a tendency to be composed of smaller individuals than those of northern Ghana. Smaller individuals often tend to have femora which appear to be slightly stockier than those of the larger specimens, but this seems perhaps to be a heterogonic growth phenomenon.

Material.—Unless otherwise stated, material below can be taken to have been collected by the author.

A. From Northern Ghana:

(i) 1 ♂, Northern reg., btwn. Bimbila and Nakwayele, 2.i.60; 1 ♂, 1 ♀, Volta reg., Ho-Hohoe rd., 10 mls. N. of Volta bridge, iii.60; 1 ♀, Volta reg., keti Krachi **R.** H. 27.xii.62. This material resembles *Ph. dorsata* Miller in many respects including colour pattern, though it is much darker than the *dorsata* material from Tanzania.

(ii) 1 ♂, Volta reg., Dutukpene-Keti Krachi rd., 11 mls. W. of Dutukpene, 27.xii.62; 2 ♀ ♀, Volta reg., Keti Krachi R. H. (27-28).xii.62; 3 ♂ ♂, Volta reg., Amedzofe, iii.60; 2 ♂ ♂, Volta reg., Amedzofe, 4.ii.62; 2 ♂ ♂, 2 ♀ ♀, Volta reg., Amedzofe (3-4).i.60; 4 ♂ ♂, 3 ♀ ♀, Volta reg., 3 mls. W. of Kpandu, 26.xii.59; 1 ♀, Volta reg., 1 ml. W. of Kpandu R. H., 23.xii.59; 2 ♀ ♀, Volta reg., plateau above and E. of Wurra-

pong, 23.xii.59; 1 ♀, Volta reg., 2 mls. S. of Otisu, Wurrapong-Keti Krachi rd., 29.xii.59; 1 ♂, Northern reg., btwn. Bimbila and Nakwayele, 2.i.60. This material corresponds with Chapman's *obliquifrons* in his 1962 paper, and like his series is confined to northern parts of Ghana, although as can be seen from the locality data it is also found in the montane grasslands of Volta region.

B. From Eastern reg., southern grasslands of Ghana:

(i) 3 ♂ ♂, Ifaks, 28.i.58; 1 ♂, Ofankor, 25.ix.58; 1 ♀, Ofankor, 11.ii.58. All collected by R. F. Chapman. This material resembles A (i) above, but the individuals are smaller.

(ii) 1 ♂, 1 ♀, Ofankor, 11.ii.58; 3 ♂ ♂, 1 ♀, Ofankor, 13.v.58; 1 ♂, Ofankor, 25.ix.58; 1 ♀, Ofankor, 1.iv.59; 2 ♂ ♂, Ofankor, 5.ii.59; 1 ♂, Akuse, 20.ii.59; 1 ♂, Akuse, 17.xii.58; 1 ♂, Legon, 15.ii.59; 1 ♂, Shai hills, 26.vii.59. All material collected by R. F. Chapman.

1 ♂, 5 mls. S. of Oyibi, Tema-Adome rd., 17.iv.62. Morphologically this material is the same as A (ii) above, but the specimens are slightly smaller.

Measurements:

A. *Northern material.*

(i) forms like *Ph. dorsata:*

Head width	(2) 2.9- 3.0, 2.96:	(2) 3.5- 3.6, 3.56
Posterior femur length	(2) 10.8-11.6, 11.21:	both-14.0, 14.0
Tegminal length	(2) 14.1-14.6, 14.35:	(2) 18.0-18.3, 18.17
Length frons to tegminal apices	(2) 19.2-20.0, 19.61:	(2) 24.4-24.8, 24.59

(ii) forms like *Ph. obliquifrons:*

Head width	(12) 2.8- 3.1, 2.92:	(13) 3.3- 3.6, 3.44
Posterior femur length	(12) 10.3-12.2, 11.28:	(13) 12.8-14.3, 13.71
Tegminal length	(12) 13.6-16.0, 14.58:	(13) 16.6-19.3, 17.57
Length frons to tegminal apices	(12) 18.3-20.3, 19.55:	(13) 22.6-26.1, 23.83

B. *Southern material from eastern end of Accra plains*

(i) forms like small *Ph. dorsata:*

Head width	(4) 2.8- 2.9, 2.89:	3.15
Posterior femur length	(4) 9.8-10.8, 10.36:	12.10
Tegminal length	(4) 12.4-14.2, 13.45:	16.49
Length frons to tegminal apices	(4) 17.3-19.2, 18.17:	21.51

(ii) forms like small *Ph. obliquifrons:*

Head width	(12) 2.6- 2.9, 2.70:	(4) 3.0- 3.4, 3.22
Posterior femur length	(8) 8.0-11.1, 9.67:	(4) 11.4-12.0, 11.62
Tegminal length	(12) 11.4-14.0, 13.00:	(4) 14.7-17.3, 15.86
Length frons to tegminal apices	(12) 16.6-19.1, 17.71:	(4) 19.6-23.0, 21.39

Apart from external size differences, these forms possess identical phallic complexes in the males, the phallic complex being almost the same size whether dissected from a large or small form.

Conclusion.—It would seem best to consider forms (i) and (ii) as colour forms of the same insect, while A. and B. represent the larger northern and smaller southern form of the species. All localities for B are indeed from the eastern end of the Accra plain, suggesting an incursion via the Volta gap from the north of Ghana.

Azarea verticula sp. nov.

Male.—Antennae rather longer than head and pronotum, segments 3-11 being flattened above and matte surfaced. Antennae widened beyond segment 2, but not conspicuously more serrate on outer than inner margin (fig. 57).

Head acutely conical in profile. Vertex projecting beyond line joining front edge of each compound eye by about 2/3 length of compound eye (fig. 56). Margins of frontal ridge raised and diverging between antennal sockets, but distinctly convergent immediately behind (fig. 60). Head with distinct median carina on vertex. Carina conspicuously higher in front. Vertex on either side of median carina

with three shallow ridges, bordered below by a glabrous band running from postero-dorsal angle of compound eye to back of head on each side, this being carried back onto sides of pronotum below dorso-lateral carinae.

Pronotum with distinct low median and dorso-lateral carinae. Dorso-lateral carinae delicately incised by sulci 2-4 (sulcus 2 often very faint), but median carina only cut by 4th. (fig. 56). Disc on either side of median carina, anterior to transverse sulcus 4 weakly and rugosely ridged with 2 ridges on either side. Behind sulcus 4, disc of pronotum with 2 pronounced ridges between median and lateral carinae on either side. Lower margin of lateral lobes of pronotum sinuous and produced downwards posteriorly (fig. 57). Dorso-posterior margin of pronotum obtusely angled.

Tegmina extending well beyond tips of posterior femora. Scapular field expanded, densely reticulate in its basal 2/5 but containing about 10 to 12 hyaline cells in its expanded portion (fig. 59).

Posterior femora rather short, less than 0.6 times length of tegmen. Posterior tibiae with 11-12 inner and 10 outer spines. Tibiae light brown, blackish on inner side.

General colouration dark brown or black above, with a light straw coloured side stripe which extends onto posterior femora. Often however almost completely dark brown or even black.

Epiphallus as in fig. 58.

Females.—General proportions those of male, but antennae conspicuously shorter than head and pronotum. Scapular field of tegmina not expanded or greatly modified as in male. Upper pair of ovipositor valves quite acutely pointed (fig. 61).

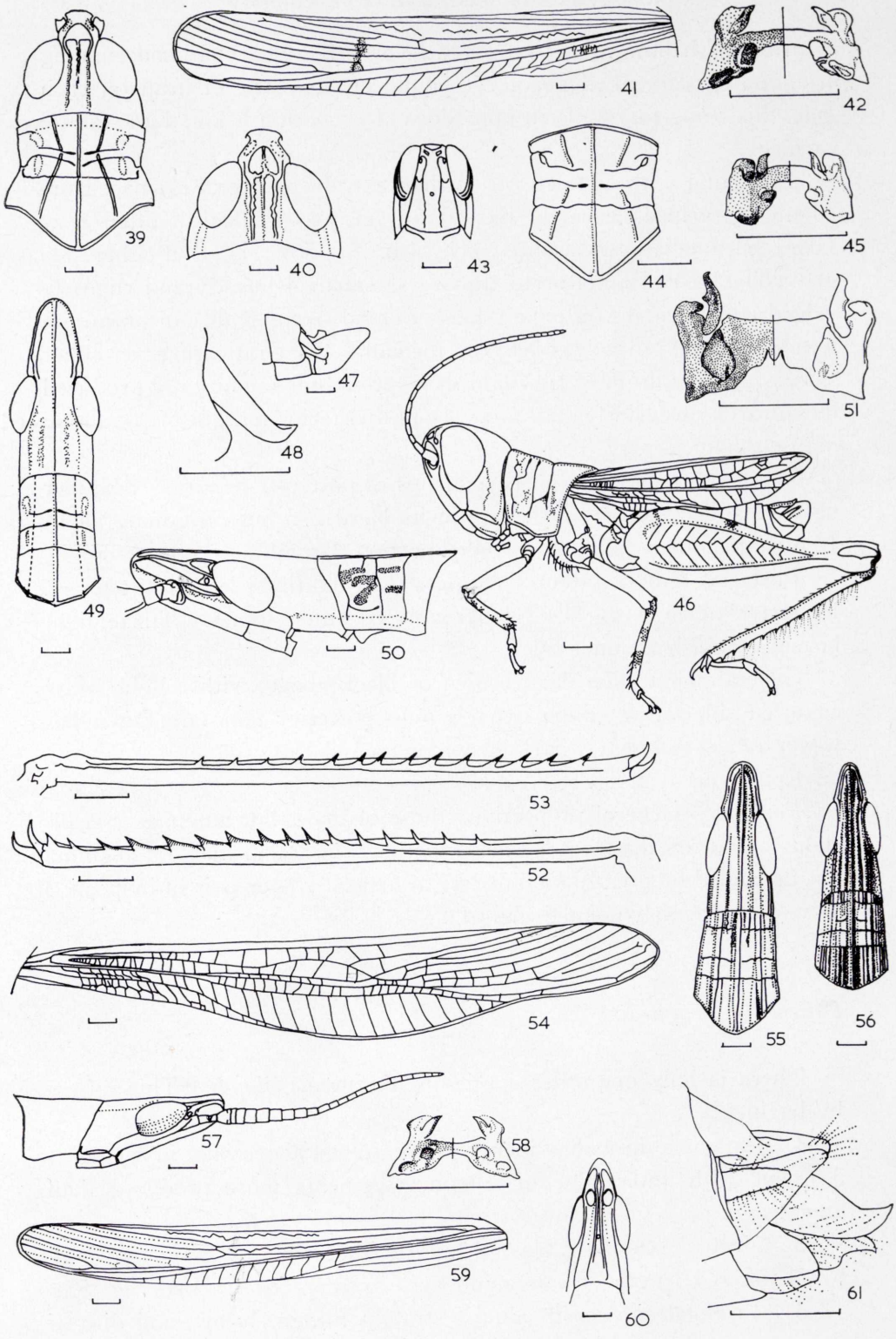
Differential diagnosis:

There is only one other species in the genus, *lloydi.* This differs by having:

1. Antennae in male widened and flattened above only in segments 3-9, but with outer edge of antennal segments more produced than inner edge.

2. Vertex extending beyond line of front edge of compound eyes by about 3/4 length of compound eyes as seen from above (fig. 55).

3. Pronotal sides with almost straight margin below, and disc of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pronotum more elongate (about 2.8 times as long as width of front margin across lateral pronotal carinae). Dorsolateral pronotal carinae cut only by sulci 3 and 4.

4. Expanded scapular portion of male tegmen with only about 9 transparent membranous cells.

5. Posterior femora more than .65 times length of tegmina.

6. Eight eyestripes not 6 as in new species.

Measurements	*Males*	*Females*
Head width (8)	1.8- 2.0, 1.93:	(2) 2.2- 2.3, 2.25
Posterior femur length (8)	7.9- 8.6, 8.37:	(2) 9.0- 9.9, 9.45
Tegminal length (8)	13.3-15.1, 14.21:	(2) 16.8-19.6, 18.20
Length frons to tegminal apices (8)	19.7-21.4, 20.65:	(2) 24.2-26.5, 25.37

Material.—All material from Ghana. Holotype ♂ Northern reg., 4 mls. N. of Mole R., Busunu-Doboye rd., 26.xii.63, N. D. Jago. Paratypes: 3 ♂ ♂, same data as holotype; 1 ♂, Northern reg., Kalbruipe, 17.iv.59, R. F. Chapman; 2 ♂ ♂, Upper reg., 5 mls. E. of Han, W. of Tumu, 7.iv.62, N. D. Jago; 1 ♀, 10 mls. E. of Han, 19.iv.62, N. D. Jago; 1 ♀, Upper reg., Mamprusi, N. of Nakpanduri, 1.i.60, N. D. Jago.

Discussion.—This interesting little insect lives in dry savannah localities, and like its relative *A. lloydi* is capable of striking melanic colour change on the burning of the grass. It looks very much like a black or buff chipp of broken grass stem, and is very easily overlooked.

Figs. 39-42.—*Dnopherula leionota* sp. nov.: 39) dorsal aspect head and pronotum of male; 40) dorsal aspect head and pronotum of female; 41) rigth tegmen of male; 42) epiphallus of male. Figs. 43-46.—*Phoremula acerosa* sp. nov. male anatomy: 43) anterior view of head; 44) dorsal aspect of pronotum; 45) epiphallus; 46) whole insect from left side. Figs. 47-54.—*Brachycrotaphus longicornis* sp. nov. male anatomy: 47) tip of abdomen from left side; 48) left cercus; 49) dorsal aspect of head and pronotum; 50) lateral aspect of same; 51) epiphallus; 52) left posterior tibia — inner side; 53) left posterior tibia — outer side; 54) left tegmen. Figs. 55-61.—*Azarea* spp.: 55) *Azarea lloydi* Uv., dorsal aspect head and pronotum of male; 56-60.—*Azarea verticulata* sp. nov. male anatomy; 56) dorsal aspect head and pronotum; 57) lateral aspect of same; 58) epiphallus; 59) right tegmen; 60) front seen from normal aspect; 61) *A. verticulata* female abdominal apex from left side. All scale lines represent 1 mm.

The species is generally phytophilous, but if chased it will fall into the ash or dead grass trash and lie motionless. The smaller number of eyestripes may indicate that it has fewer instars in the life cycle than *lloydi*. It seems to live in drier habitats than *lloydi*.

Brachycrotaphus longicornis sp. nov.

Males.—Head elongate with vertex in front of a line joining front edge of compound eyes 1 1/2 times longer than eyes as seen from above (fig. 49). Head and pronotum smooth, not hairy. Median carina of vertex pronounced anteriorly. Antennae elongate, about 1 1/2 times length of head and pronotum as seen from above. Segment 3 greatly expanded; segments 4-9 also expanded on outer side but less so. Segments 10 enwards gradually tapered.

Pronotum with weak lateral carinae. Lateral carinae weakly developed behind 4th. sulcus, and often almost obsolete between 2 and 4. Median carina distinct throughout but cut by 4th. transverse sulcus. Postero-lateral corner of pronotum rectangular. Lower margin of pronotal side lobes slightly undulate (fig. 50).

Tegmina with sinuous costal vein (fig. 54), scapular area, between closest approximation of costal vein with Sc, containing 20-23 cells. Scapular area greatly expanded. Vein between discoidal and interulnar fields markedly sinuous, bent forwards near its middle to enclose 6-8 cells in middle of tegmen. Tegmina just less than twice length of posterior femora.

Posterior femora yellowish internally, darker above. Slender, length to depth ratio about 6.1 (cr. *B. büttneri* ratio 5.8). Thirteen to sixteen inner, and twelve to fourteen outer posterior tibial spines. Counting from distal end of inner row, spines 3-5 to 9-12 showing some degree of procumbency and serrate along upper margin, spines 5-8 or 9 markedly so (fig. 52). Other spines normal.

Cerci short, rather straight, apically slightly inflated and incurved. Tips of cerci falling well short of half way along side of sub-genital plate (fig. 47, 48). Epiphallus fig. 51.

General colour of abdomen straw yellow. Antennae brownish yellow in apical 2/3, dark brown basally. Tegmina dark brown with head and pronotum blackish brown above with a pale stripe from base of antennae, below eye and along lower edge of pronotum on either

side carried onto side of meso- and metathorax. Frons, clypeus, and labrum light brown. Fore and mid legs light brown. Posterior tibiae light brownish with spines black tipped. The series of material was collected from burnt grasses at the height of the dry season. It probably occurs as a lighter colour form during the rains. Indeed uniformly light brown specimens also occurred but the light lateral stripe was still visible.

Females.—General colouration as for males. Some very dark specimens occurred however, with lighter median dorsal stripe and outer area of posterior femora dark above and light brown below. Posterior tibiae without modified spines on inner row (14-15 inner and 12-14 outer spines). Tegmina unmodified, lacking expanded cells on margin.

Antennae shorter to longer than head and pronotum, segments 3-10 or 11 distinctly expanded on outer margin, segment 11 or 12-19 or 22 sub-cylindrical. Vertex with distinct median dorsal carina extending only 1/2 way along length of eyes. Length of vertex in front of front edge of compound eyes distinctly longer than length of eyes by 1 1/3 times.

Differential diagnosis:

The following diagnosis refers to males.

1. Differs from *B. steindachneri* Krauss in having a proportionately longer vertex, and in being an overall larger insect with proportionately longer antennae.

In *B. steindachneri* Krauss the scapular field contains only about 18 cells in the region occupied by the 20-23 of the new species. There are 12 outer and 16 inner posterior tibial spines, i.e. fewer in outer row. However inner row of spines resembles those of the new species in degree of procumbency (fig. 52). Cercus and sub-genital plate very similar.

2. Differs from *B. tryxalicerus* (Fischer) which has 14 outer and 15 inner posterior tibial spines, of which 1-9 on inner row are very procumbent. Similar development of cells in scapular field, but expanded distal protion of discoidal field almost parallel sided and containing about 6 cells. Antennae of *B. tryxalicerus* (Fischer) much shorter (equal in length to head and pronotum together). Moreover vertex is short like that of *B. steindachneri* Krauss.

3. Differs from *B. büttneri* Karsch which has scarcely widened basal antennal segments 3-8. Most distinctively *B. büttneri* Karsch has the discoidal field hardly narrowed in its middle. Only about 19 cells in discoidal field. Posterior femora stockier in this species, i.e. length to depth around 5.8, while tegmina/posterior femora ratio smaller, i.e. about 1.5-1.6, in new species being near 2.0. Vertex in *B. büttneri* much shorter. 15 inner and 12 outer posterior tibial spines, with little procumbency in spines in inner row (spines 4-8 show some degree of decumbency but are more erect than those of new species).

4. Unlike *B. karschi* Uvarov in lacking any sparse hairs on head and pronotum, coppery sheen of tegmina, and scarcely narrowed discoidal field of tegmina. Scapular field contains about 23 cells in *B. karschi* thus being similar to *B. longicornis* sp. nov. in this respect. Length of vertex similar to that in *B. karschi.* In *karschi* there are 14 inner and 12 outer spines on posterior tibiae, of which inner spines 2-7 show moderate decumbency, the new species differing in this character.

The new species thus differs from all its sympatric Ghanaian relatives in having a unique combination of characters.

Measurements	*Males*	*Females*
Head width (8)	2.6- 3.0, 2.83:	(13) 2.9- 3.7, 3.47
Posterior femur length (8)	10.6-12.0, 11.38:	(13) 13.4-15.8, 14.60
Tegminal length (8)	18.8-22.2, 20.04:	(13) 21.8-26.5, 24.45
Length frons to tegminal apices (8)	27.4-31.5, 28.75:	(13) 31.8-38.4, 35.82

Material.—All from Ghana, Northern region, and collected by the author. Holotype ♂ 4 mls. N. of Mole R., Busunu-Deboye rd. (23-29).xii.63. Paratypes: 10 ♂ ♂, 17 ♀ ♀, same data as holotype.

Discussion.—The specimens collected varied in colour from light brown specimens with every intermediate form through to black. The habitat had been burnt over, and consisted of stubble and charred tufts from which green shoots were sprouting. The grasshoppers were feeding on these green shoots and also on the ash, presumably for the mineral content.

It is clear that the genus *Brachycrotaphus* contains a complex of species many of which are probably not of true species rank. When

enough material is available an extremely interesting and complex distribution of infra-specific forms may very well emerge which could well be analysed numerically.

All holotypes have been deposited with the British Museum (Natural History), London. Paratypes are to be found both in London and at the University of Ghana, Legon, in the zoology departament collections. All measurements are given in millimetres. For each measurement the number of individuals, range and mean are given.

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